

18. (Presently Presented) The electrode structure according to claim 5, wherein the interior angles and the conjugate angles of the bending processed portions are 90 degrees to 270 degrees.

REMARKS

Claims 1-2 have been rewritten to correct typographical errors, more definitely set forth the invention, and obviate the rejection. The present amendment is deemed not to introduce new matter. Claims 1-18 are in the application, claims 7 and 8 having been withdrawn from consideration in response to the Restriction Requirement mailed June 19, 2007.

Pursuant to the telephone discussion with Examiner Holmes on October 25, 2007, it is understood that the rejections of claims 7 and 8 in the Office Action mailed August 1, 2007, were applied erroneously, as claims 7 and 8 were previously withdrawn from consideration. Therefore, as discussed with Examiner Holmes, the rejections of claims 7 and 8 shall not be addressed herein, and it is understood that the Examiner shall rescind the rejections thereof.

Reconsideration is respectfully requested of the rejection of claim 1 and 6-7 under 35 U.S.C. 102(b) as being anticipated by Grossman et al. (U.S. Patent No. 4,979,517).

The Grossman, et al. reference discloses a flexible, disposable stimulation electrode having low current densities and a long shelf life. In particular, as shown in Fig. 1, the electrode 10 is comprised of a "nonconductive backing layer 12; a layer of conductive gel 18; a thin, circular metal plate 16 having a radially extended arm 48; an electrode post assembly 14

including an electrode post 42; insulating tape 34; and a protective liner 54” (see column 3, lines 34-38). “The nonconductive backing layer 12 is preferably formed of a flexible, nonwetable material having a high dielectric characteristic. A suitable material is polyethylene” (see column 3, lines 43-46).

In contrast, the present invention provides an electrode structure comprising: a support having bending processed portions, an electrode layer formed on the support, so as to pass over the bending processed portions, and an insulating layer formed on the electrode layer passing over the bending processed portions, said insulating layer including a dielectric material, wherein the glass transition temperature of said dielectric material is 25°C or below. Contrary to the Examiners’ assertions, it is believed that Grossman, et al. fail to teach or suggest an electrode structure having an insulating layer including a dielectric material having a glass transition temperature of 25°C or below. Rather, that teaching is believed to come only from the present invention.

In particular, the present inventors discovered that during the molding step in the manufacturing process of electrode structures formed with supports having bending processed portions (i.e., electrodes having bent supporting structures), cracks undesirably formed in the electrode layer and insulating layer. These defects were discovered to be due to the insulating layer not being extended during the molding process, and the electrode layer not complying with

the extension of the film during molding (see Specification, page 5, lines 16-22). Formation of such cracks in the electrode structure can lead to undesirable electrical leaks.

The present inventors unexpectedly discovered that when dielectric materials having a glass transition temperature of 25°C or below are used to form the insulating layer, no cracks were formed in the insulating layer during the molding process. Further, it was found that if a dielectric material having a glass transition temperature of -20°C or below is used to form the insulating layer, no cracks were formed in the insulating layer, even in locations adjacent to bending processed portions of the underlying support where the angle of the bending processed portions are great (see Specification, page 5, last line, to page 6, line 7).

In view of the deficiency of the Grossman, et al. reference, i.e., the failure of same to disclose the important claimed glass transition temperature characteristic of the dielectric material claimed herein, it is hereby urged that Grossman, et al. fails to anticipate the present invention as claimed herein. Withdrawal of the rejection is accordingly respectfully requested.

Reconsideration is respectfully requested of the rejection of claims 2-5 and 9-18 under 35 U.S.C. 103(a) as being unpatentable over Grossman as applied to claims 1 and 6-7 above, and further in view of Ikeda, et al. (U.S. Patent No. 5,582,697).

The primary Grossman, et al. reference is discussed above in detail.

The Examiner has acknowledged that Grossman, et al. fail to disclose the composition of the electrode layer. To cure this deficiency, the Examiner has cited the secondary reference of Ikeda, et al. The Ikeda, et al. reference is concerned with a biosensor comprised of "an electrically insulating substrate, an electrode system formed on the substrate including a working electrode, a

counter electrode and a third electrode used for detecting a liquid junction, and a reaction layer that is formed over at least the working electrode and the counter electrode" (see column 2, lines 39-44).

As asserted by the Examiner, Ikeda, et al. does teach that the electrodes can be formed of silver paste, carbon paste, or silver/silver chloride (see column 5, lines 21-24). However, as discussed above, the primary Grossman, et al. reference fails to teach or suggest an electrode structure having an insulating layer comprised of a dielectric material having a glass transition temperature of 25°C or below. Rather, that teaching or suggestion is believed to come only from the present invention, and constitute an important element or aspect thereof.

In view of the deficiencies of the primary Grossman, et al. reference discussed above, it is believed that the Examiner's combination of cited references fails to render unpatentable the present invention as claimed herein. Withdrawal of the rejection is accordingly respectfully requested.

Reconsideration is respectfully requested of the rejection of claims 2 and 8 (which has been previously withdrawn) under 35 U.S.C. 103(a) as being unpatentable over Grossman, and further in view of Netherly (U.S. Patent No. 5,947,961).

The primary Grossman, et al. reference is discussed above in detail.

The Examiner has acknowledged that Grossman, et al. fail to disclose the thickness and method of formation of the insulating layer. To cure this deficiency, the Examiner has cited the secondary reference of Netherly. The Netherly reference discloses biomedical electrodes, wherein the electrode is a dispersive electrode that alters the impedance characteristics of the patient's

tissues to reduce edge effect (see column 2, lines 44-47). As illustrated in Fig. 2, the electrode includes a layer 26 of lossy dielectric material. The layer 26 can be formed from an ink or paint, and can be screen printed or sprayed in an appropriately shaped pattern onto the electrode 10 (see column 7, lines 28-35).

As discussed above, the present invention provides an electrode structure comprising a support having bending processed portions, an electrode layer formed on the support, so as to pass over the bending processed portions, and an insulating layer formed on the electrode layer passing over the bending processed portions, said insulating layer including a dielectric material, *wherein the glass transition temperature of said dielectric material is 25°C or below*. Grossman, et al. fail to teach or suggest such an electrode structure having an insulating layer *comprised of a dielectric material having a glass transition temperature of 25°C or below*. The present inventors unexpectedly discovered that when the insulating layer comprises dielectric materials having a glass transition temperature of 25°C or below, no cracks were formed in the insulating layer during the molding process. Neither Grossman, et al. nor Netherly teach or suggest this important element of the present invention.

In view of the failure of both the Grossman, et al. and Netherly reference to teach or suggest the claimed dielectric material having a glass transition temperature of 25°C or below, it is believed that the Examiner would be justified in no longer maintaining the invention. Withdrawal of the rejection is accordingly respectfully requested.

Reconsideration is respectfully requested of the rejection of claims 1-18 under 35 U.S.C. 103(a) as being unpatentable over Kelly, et al. (U.S. Patent No. 6,219,569) and further in view of Grossman, et al.

Kelly, et al. discloses a disposable non-conducting flexible sheet incorporating a fixed array of electrical conducting strips emanating from a terminus that can connect to a standard electrocardiographic cable or telemetric unit. As the Examiner has recognized, Kelly, et al. fails to disclose an insulator having a glass transition temperature of at least 25°C or below, and bending portions that are between 90 and 270 degrees.

The Examiner has attempted to cure these deficiencies by citing Grossman, et al. as a secondary reference. However, as discussed in detail above, Grossman, et al. also fail to teach or suggest an electrode structure having an insulating layer including a dielectric material having a glass transition temperature of 25°C or below. Thus, neither of the Examiner's cited references teach or suggest this important element of the present invention.

In view of the deficiencies of the cited combination of references, it is believed that the Examiner would be justified in no longer maintaining the rejection. Withdrawal of the rejection is accordingly respectfully requested.

In view of the foregoing, it is respectfully submitted that the application is now in condition for allowance, and early action and allowance thereof is accordingly respectfully requested. In the event there is any reason why the application cannot be allowed at the present time, it is respectfully requested that the Examiner contact the undersigned at the number listed below to resolve any problems.

Respectfully submitted,

Donald E. Townsend, Jr.

Donald E. Townsend, Jr.
Reg. No. 43,198

Customer No. 27955

Date: October 31, 2007

TOWNSEND & BANTA
Suite 900, South Building
601 Pennsylvania Ave., N.W.
Washington, D.C. 20004
(202) 220-3124

CERTIFICATE OF TRANSMISSION

I hereby certify that this 11-page Amendment in Docket No. MUR-041-USA-PCT, Serial No. 10/505,158, filed August 20, 2004, is being facsimile transmitted to the United States Patent and Trademark Office (Fax No. 571-273-8300) on October 31, 2007.

Donald E. Townsend, Jr.

Donald E. Townsend, Jr.
Reg. No. 43,198